



SEQUENCE LISTING

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<10> E. I. du Pont de Nemours and Company

<120> Plant Cellulose Synthases

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<151> 1998-07-14

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<213> Hordeum vulgare

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<212> PRT

<213> Hordeum vulgare

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Ile Asn Leu Ser Asp Arg Leu Asn Gln Val Leu Arg Trp Ala Leu Gly
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 85 90 95
 Val Cys Gln Ile Cys Gly Asp Asp Val Gly Arg Asn Pro Asp Gly Glu
 100 105 110
 Pro Phe Val Ala Cys Asn Glu Cys Ala Phe Pro Ile Cys Arg Asp Cys
 115 120 125
 Tyr Glu Tyr Glu Arg Arg Glu Gly Thr Gln Asn Cys Pro Gln Cys Lys
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 Glu Glu Asp Gly Val Asp Asp Leu Glu Asn Glu Phe Asn Trp Ser Asp
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 180 185 190
 Ser Tyr Gly Arg Gly Ala Asp Leu Asp Gly Val Pro Gln Pro Phe His
 195 200 205
 Pro Ile Pro Asn Val Pro Leu Leu Thr Asn Gly Gln Met Val Asp Asp
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 Ile Pro Pro Asp Gln His Ala Leu Val Pro Ser Phe Val Gly Gly Gly
 225 230 235 240
 Gly Lys Arg Ile His Pro Leu Pro Tyr Ala Asp Pro Asn Leu Pro Val
 245 250 255
 Gln Pro Arg Ser Met Asp Pro Ser Lys Asp Leu Ala Ala Tyr Gly Tyr
 260 265 270
 Gly Ser Val Ala Trp Lys Glu Arg Met Glu Ser Trp Lys Gln Lys Gln
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Ile	Ile	Arg	Leu	Val	Val	Leu	Cys	Phe	Phe	Phe	His	Tyr	Arg	Val	Met	
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His	Pro	Val	Pro	Asp	Ala	Phe	Ala	Leu	Trp	Leu	Ile	Ser	Val	Ile	Cys	
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 <212> DNA
 <213> Zea mays

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<213> Zea mays

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Ser Val Tyr Cys Thr Pro Thr Arg Pro Ala Phe Lys Gly Ser Ala Pro
          35          40          45

Ile Asn Leu Ser Asp Arg Leu His Gln Val Leu Arg Trp Ala Leu Gly
          50          55          60

Ser Val Glu Ile Phe Met Ser Arg His Cys Pro Leu Trp Tyr Ala Tyr
          65          70          75          80

Gly Gly Arg Leu Lys Trp Leu Glu Arg Phe Ala Tyr Thr Asn Thr Ile
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Val Tyr Pro Phe Thr Ser Ile Pro Leu Leu Ala Tyr Cys Thr Ile Pro
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Ala Val Cys Leu Leu Thr Gly Lys Phe Ile Ile Pro Thr Leu Asn Asn
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Leu Ala Ser Ile Trp Phe Ile Ala Leu Phe Leu Ser Ile Ile Ala Thr
          130          135          140

Ser Val Leu Glu Leu Arg Trp Ser Gly Val Ser Ile Glu Asp Trp Trp
          145          150          155          160

Arg Asn Glu Gln Phe Trp Val Ile Gly Gly Val Ser Ala His Leu Phe
          165          170          175

Ala Val Phe Gln Gly Phe Leu Lys Val Leu Gly Gly Val Asp Thr Ser
          180          185          190

Phe Thr Val Thr Ser Lys Ala Ala Gly Asp Glu Ala Asp Ala Phe Gly
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Asp Leu Tyr Leu Phe Lys Trp Thr Thr Leu Leu Val Pro Pro Thr Thr
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Leu Ile Ile Ile Asn Met Val Gly Ile Val Ala Gly Val Ser Asp Ala
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			260					265					270		
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		275					280					285			
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	290					295					300				
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Ser Gly Ala Ala Gly Gly Gly Ala Ala Arg Arg Ala Glu Ala Pro Cys
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Cys Pro Gln Cys Lys Thr Arg Tyr Lys Arg Leu Lys Gly Cys Gln Arg
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 Asp Asp Gly Asp Asp Ala Asp Leu Pro Leu Met Asp Glu Ala Arg Gln
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 Gln Leu Ser Arg Lys Ile Pro Leu Pro Ser Ser Gln Ile Asn Pro Tyr
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 Arg Met Ile Ile Ile Ile Arg Leu Val Val Leu Gly Phe Phe Phe His
 275 280 285
 Tyr Arg Val Met His Pro Val Asn Asp Ala Phe Ala Leu Trp Leu Ile
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 Ser Val Ile Cys Glu Ile Trp Phe Ala Met Ser Trp Ile Leu Asp Gln
 305 310 315 320
 Phe Pro Lys Trp Phe Pro Ile Glu Arg Glu Thr Tyr Leu Asp Arg Leu
 325 330 335
 Ser Leu Arg Phe Asp Lys Glu Gly Gln Pro Ser Gln Leu Ala Pro Ile
 340 345 350
 Asp Phe Phe Val Ser Thr Val Asp Pro Leu Lys Glu Pro Pro Leu Val
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 Thr Thr Asn Thr Val Leu Ser Ile Leu Ser Val Asp Tyr Pro Val Asp
 370 375 380
 Lys Val Ser Cys Tyr Val Ser Asp Asp Gly Ala Ala Met Leu Thr Phe
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 Glu Ala Leu Ser Glu Thr Ser Glu Phe Ala Lys Lys Trp Val Pro Phe
 405 410 415
 Cys Lys Arg Tyr Asn Ile Glu Pro Arg Ala Pro Glu Trp Tyr Phe Gln
 420 425 430
 Gln Lys Ile Asp Tyr Leu Lys Asp Lys Val Ala Ala Asn Phe Val Arg
 435 440 445
 Glu Arg Arg Ala Met Lys Arg Glu Tyr Glu Glu Phe Lys Val Arg Ile
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 Asn Ala Leu Val Ala Lys Ala Gln Lys Val Pro Glu Glu Gly Trp Thr
 465 470 475 480

Met Gln Asp Gly Thr Pro Trp Pro Gly Asn Asn Val Arg Asp His Pro
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 Gly Met Ile Gln Val Phe Leu Gly Gln Ser Gly Gly Leu Asp Cys Glu
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 Gly Asn Glu Leu Pro Arg Leu Val Tyr Val Ser Arg Glu Lys Arg Pro
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 Gly Tyr Asn His His Lys Lys Ala Gly Ala Met Asn Ala Leu Val Arg
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 Val Ser Ala Val Leu Thr Asn Ala Pro Tyr Leu Leu Asn Leu Asp Cys
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 Asp His Tyr Ile Asn Asn Ser Lys Ala Ile Lys Glu Ala Met Cys Phe
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 Met Met Asp Pro Leu Leu Gly Lys Lys Val Cys Tyr Val Gln Phe Pro
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 Pro Ile Tyr Val Gly Thr Gly Cys Val Phe Arg Arg Gln Ala Leu Tyr
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 Gly Tyr Asp Ala Pro Lys Thr Lys Lys Pro Pro Ser Arg Thr Cys Asn
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 Cys Trp Pro Lys Trp Cys Phe Cys Cys Cys Cys Phe Gly Asn Arg Lys
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 675 680 685
 Phe Lys Lys Glu Glu Asn Gln Ser Pro Ala Tyr Ala Leu Gly Glu Ile
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 Asp Glu Ala Ala Pro Gly Ala Glu Asn Glu Lys Ala Gly Ile Val Asn
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 Gln Gln Lys Leu Glu Lys Lys Phe Gly Gln Ser Ser Val Phe Val Thr
 725 730 735
 Ser Thr Leu Leu Glu Asn Gly Gly Thr Leu Lys Ser Ala Ser Pro Ala
 740 745 750
 Ser Leu Leu Lys Glu Ala Ile His Val Ile Ser Cys Gly Tyr Glu Asp
 755 760 765
 Lys Thr Asp Trp Gly Lys Glu Ile Gly Trp Ile Tyr Gly Ser Val Thr
 770 775 780
 Glu Asp Ile Leu Thr Gly Phe Lys Met His Cys His Gly Trp Arg Ser
 785 790 795 800

Ile Tyr Cys Ile Pro Lys Arg Val Ala Phe Lys Gly Ser Ala Pro Leu
 805 810 815
 Asn Leu Ser Asp Arg Leu His Gln Val Leu Arg Trp Ala Leu Gly Ser
 820 825 830
 Ile Glu Ile Phe Phe Ser Asn His Cys Pro Leu Trp Tyr Gly Tyr Gly
 835 840 845
 Gly Gly Leu Lys Phe Leu Glu Arg Phe Ser Tyr Ile Asn Ser Ile Val
 850 855 860
 Tyr Pro Trp Thr Ser Ile Pro Leu Leu Ala Tyr Cys Thr Leu Pro Ala
 865 870 875 880
 Ile Cys Leu Leu Thr Gly Lys Phe Ile Thr Pro Glu Leu Asn Asn Val
 885 890 895
 Ala Ser Leu Trp Phe Met Ser Leu Phe Ile Cys Ile Phe Ala Thr Ser
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 Asn Glu Gln Phe Trp Val Ile Gly Gly Val Ser Ser His Leu Phe Ala
 930 935 940
 Val Phe Gln Gly Leu Leu Lys Val Ile Ala Gly Val Asp Thr Ser Phe
 945 950 955 960
 Thr Val Thr Ser Lys Gly Gly Asp Asp Glu Glu Phe Ser Glu Leu Tyr
 965 970 975
 Thr Phe Lys Trp Thr Thr Leu Leu Ile Pro Pro Thr Thr Leu Leu Leu
 980 985 990
 Leu Asn Phe Ile Gly Val Val Ala Gly Val Ser Asn Ala Ile Asn Asn
 995 1000 1005
 Gly Tyr Glu Ser Trp Gly Pro Leu Phe Gly Lys Leu Phe Phe Ala Phe
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 Trp Val Ile Val His Leu Tyr Pro Phe Leu Lys Gly Leu Val Gly Arg
 1025 1030 1035 1040
 Gln Asn Arg Thr Pro Thr Ile Val Ile Val Trp Ser Ile Leu Leu Ala
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 Ser Ile Phe Ser Leu Leu Trp Val Arg Ile Asp Pro Phe Leu Ala Lys
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<210> 11
 <211> 1138
 <212> DNA
 <213> Oryza sativa

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<210> 12
<211> 341
<212> PRT
<213> Oryza sativa

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Ala Ala Gly Tyr Pro Ala Gly Lys Val Thr Cys Tyr Ile Ser Asp Asp
      35             40             45

Ala Gly Ala Glu Val Thr Arg Asn Ala Val Val Glu Ala Ala Arg Phe
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Ala Ala Leu Trp Val Ser Phe Cys Arg Lys His Gly Val Glu Pro Arg
      65             70             75             80

Asn Leu Glu Ala Tyr Phe Asn Ala Gly Glu Gly Gly Gly Gly Lys Ala
      85             90             95

Lys Val Val Ala Arg Gly Ser Tyr Arg Gly Met Ala Trp Pro Glu Leu
      100            105            110

Val Arg Asp Arg Arg Arg Val Arg Arg Glu Tyr Glu Glu Met Arg Leu
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Arg Ile Asp Ala Leu Gln Ala Ala Asp Ala Arg Arg Arg Arg Arg Gly
      130            135            140

Ala Ala Asp Asp His Ala Gly Val Val Gln Val Leu Ile Asp Phe Ala
      145            150            155            160

Gly Ser Val Pro Gln Leu Gly Val Ala Asn Gly Ser Lys Leu Ile Asp
      165            170            175

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Val Ala Ser Val Asp Val Cys Leu Pro Ala Leu Val Tyr Val Cys Arg
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 Glu Lys Arg Arg Gly His Ala His His Arg Lys Ala Gly Ala Met Asn
 195 200 205
 Ala Pro Phe Ile Leu Asp Leu Asp Cys Asp Tyr Tyr Val Asn Asn Ser
 210 215 220
 Gln Ala Leu Arg Ala Gly Ile Cys Phe Met Ile Glu Arg Gly Gly Gly
 225 230 235 240
 Gly Ala Ala Glu Asp Ala Gly Ala Val Ala Phe Val Gln Phe Pro Gln
 245 250 255
 Arg Val Asp Gly Val Asp Pro Gly Asp Arg Tyr Ala Asn His Asn Arg
 260 265 270
 Val Leu Phe Asp Cys Thr Glu Leu Gly Leu Asp Gly Leu Gln Gly Pro
 275 280 285
 Ile Tyr Val Gly Thr Gly Cys Leu Phe Arg Arg Val Ala Leu Tyr Ser
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 Val Asp Leu Pro Arg Trp Arg Pro Arg Arg Ser Leu Gly Cys Arg Leu
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<210> 13

<211> 3517

<212> DNA

<213> Glycine max

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 <212> PRT
 <213> Glycine max

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 Asp Gly Asp Leu Phe Val Ala Cys Asn Glu Cys Gly Phe Pro Val Cys

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Gln Cys Lys Thr Arg Tyr Lys Arg Leu Lys Gly Ser Pro Arg Val Glu		
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Gly Asp Asp Asp Glu Glu Asp Val Asp Asp Ile Glu His Glu Phe Asn		
	100	105 110
Ile Asp Glu Gln Lys Asn Lys His Gly Gln Val Ala Glu Ala Met Leu		
	115	120 125
His Gly Arg Met Ser Tyr Gly Arg Gly Pro Glu Asp Asp Asp Asn Ser		
	130	135 140
Gln Phe Pro Thr Pro Val Ile Ala Gly Gly Arg Ser Arg Pro Val Ser		
	145	150 155 160
Gly Glu Phe Pro Ile Ser Ser Asn Ala Tyr Gly Asp Gln Met Leu Ser		
	165	170 175
Ser Ser Leu His Lys Arg Val His Pro Tyr Pro Val Ser Glu Pro Gly		
	180	185 190
Ser Ala Arg Trp Asp Glu Lys Lys Xaa Asp Gly Trp Lys Asp Arg Met		
	195	200 205
Asp Asp Trp Lys Leu Gln Gln Gly Asn Leu Gly Pro Glu Pro Asp Glu		
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Asp Pro Asp Ala Ala Met Leu Asp Glu Ala Arg Gln Pro Leu Ser Arg		
	225	230 235 240
Lys Val Pro Ile Ala Ser Ser Lys Ile Asn Pro Tyr Arg Met Val Ile		
	245	250 255
Val Ala Arg Leu Val Ile Leu Ala Phe Phe Leu Arg Tyr Arg Leu Met		
	260	265 270
Asn Pro Val His Asp Ala Leu Gly Leu Trp Leu Thr Ser Ile Ile Cys		
	275	280 285
Glu Ile Trp Phe Ala Phe Ser Trp Ile Leu Asp Gln Phe Pro Lys Trp		
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Phe Pro Ile Asp Arg Glu Thr Tyr Leu Asp Arg Leu Ser Ile Arg Tyr		
	305	310 315 320
Glu Arg Glu Gly Glu Pro Asn Met Leu Ala Pro Val Asp Val Phe Val		
	325	330 335
Ser Thr Val Asp Pro Met Lys Glu Pro Pro Leu Val Thr Ala Asn Thr		
	340	345 350
Val Leu Ser Ile Leu Ala Met Asp Tyr Pro Val Asp Lys Ile Ser Cys		
	355	360 365
Tyr Ile Ser Asp Asp Gly Ala Ser Met Cys Thr Phe Glu Ser Leu Ser		

690					695					700					
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Ile	Asn	Leu	Ser	Asp	Arg	Leu	Asn	Gln	Val	Leu	Arg	Trp	Ala	Leu	Gly
	770					775					780				
Ser	Ile	Glu	Ile	Phe	Phe	Ser	His	His	Cys	Pro	Leu	Trp	Tyr	Gly	Phe
785					790					795					800
Lys	Glu	Lys	Lys	Leu	Lys	Trp	Leu	Glu	Arg	Phe	Ala	Tyr	Ala	Asn	Thr
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			820					825					830		
Pro	Ala	Val	Cys	Leu	Leu	Thr	Asp	Lys	Phe	Ile	Met	Pro	Pro	Ile	Ser
		835					840					845			
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Thr	Gly	Ile	Leu	Glu	Leu	Lys	Trp	Ser	Gly	Val	Ser	Ile	Glu	Glu	Trp
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Trp	Arg	Asn	Glu	Gln	Phe	Trp	Val	Ile	Gly	Gly	Val	Ser	Ala	His	Leu
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Phe	Ala	Val	Ile	Gln	Gly	Leu	Leu	Lys	Val	Leu	Ala	Gly	Ile	Asp	Thr
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Asn	Phe	Thr	Val	Thr	Ser	Lys	Ala	Thr	Asp	Asp	Glu	Glu	Phe	Gly	Glu
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Leu	Tyr	Thr	Phe	Lys	Trp	Thr	Thr	Leu	Leu	Ile	Pro	Pro	Thr	Thr	Ile
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Leu	Ile	Ile	Asn	Ile	Val	Gly	Val	Val	Ala	Gly	Ile	Ser	Asp	Ala	Ile
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Asn	Asn	Gly	Tyr	Gln	Ser	Trp	Gly	Pro	Leu	Phe	Gly	Lys	Leu	Phe	Phe
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		995					1000					1005			
Leu	Ala	Ser	Ile	Phe	Ser	Leu	Leu	Trp	Val	Arg	Ile	Asp	Pro	Phe	Val

1010 1015 1020

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1025 1030 1035

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<211> 2125
<212> DNA
<213> Glycine max

<400> 15

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<210> 16
<211> 610
<212> PRT
<213> Glycine max

<400> 16

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			20					25					30		

Val Phe Leu Gly His Ser Gly Gly Leu Asp Thr Asp Gly Asn Glu Leu
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 His Lys Lys Ala Gly Ala Met Asn Ala Leu Ile Arg Val Ser Ala Val
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 Asn Asn Ser Lys Ala Leu Lys Glu Ala Met Cys Phe Met Met Asp Pro
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 Val Leu Gly Lys Lys Thr Cys Tyr Val Gln Phe Pro Gln Arg Phe Asp
 115 120 125
 Gly Ile Asp Leu His Asp Arg Tyr Ala Asn Arg Asn Ile Val Phe Phe
 130 135 140
 Asp Ile Asn Met Lys Gly Gln Asp Gly Val Gln Gly Pro Val Tyr Val
 145 150 155 160
 Gly Thr Gly Cys Cys Phe Asn Arg Gln Ala Leu Tyr Gly Tyr Asp Pro
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 Val Leu Thr Glu Glu Asp Leu Glu Pro Asn Ile Ile Val Lys Ser Cys
 180 185 190
 Cys Gly Ser Arg Lys Lys Gly Lys Gly Gly Asn Lys Lys Tyr Ser Asp
 195 200 205
 Lys Lys Lys Ala Met Gly Arg Thr Glu Ser Thr Val Pro Ile Phe Asn
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 Met Glu Asp Ile Glu Glu Gly Val Glu Gly Tyr Asp Asp Glu Arg Thr
 225 230 235 240
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 245 250 255
 Val Phe Ile Ala Ala Thr Phe Met Glu Gln Gly Gly Ile Pro Pro Ser
 260 265 270
 Thr Asn Pro Ala Thr Leu Leu Lys Glu Ala Ile His Val Ile Ser Cys
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 Gly Tyr Glu Asp Lys Thr Glu Trp Gly Lys Glu Ile Gly Trp Ile Tyr
 290 295 300
 Gly Ser Val Thr Glu Asp Ile Leu Thr Gly Phe Lys Met His Ala Arg
 305 310 315 320
 Gly Trp Ile Ser Ile Tyr Cys Met Pro Pro Arg Pro Ala Phe Lys Gly
 325 330 335
 Ser Ala Pro Ile Asn Leu Ser Asp Arg Leu Asn Gln Val Leu Arg Trp
 340 345 350

Ala Leu Gly Ser Ile Glu Ile Phe Leu Ser Arg His Cys Pro Leu Trp
355 360 365

Tyr Gly Tyr Asn Gly Lys Leu Lys Pro Leu Met Arg Leu Ala Tyr Ile
370 375 380

Asn Thr Ile Val Tyr Pro Phe Thr Ser Ile Pro Leu Ile Ala Tyr Cys
385 390 395 400

Thr Leu Pro Ala Phe Cys Leu Leu Thr Asn Lys Phe Ile Ile Pro Glu
405 410 415

Ile Ser Asn Phe Ala Ser Met Trp Phe Ile Leu Leu Phe Val Ser Ile
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Phe Thr Thr Ser Ile Leu Glu Leu Arg Trp Ser Gly Val Ser Ile Glu
435 440 445

Asp Trp Trp Arg Asn Glu Gln Phe Trp Val Ile Gly Gly Thr Ser Ala
450 455 460

His Leu Phe Ala Val Phe Gln Gly Leu Leu Lys Val Leu Ala Gly Ile
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Asp Thr Asn Phe Thr Val Thr Ser Lys Ala Ser Asp Glu Asp Gly Asp
485 490 495

Phe Ala Glu Leu Tyr Val Phe Lys Trp Thr Ser Leu Leu Ile Pro Pro
500 505 510

Thr Thr Val Leu Ile Val Asn Leu Val Gly Ile Val Ala Gly Val Ser
515 520 525

Tyr Ala Ile Asn Ser Gly Tyr Gln Ser Trp Gly Pro Leu Phe Gly Lys
530 535 540

Leu Phe Phe Ala Ile Trp Val Ile Ala His Leu Tyr Pro Phe Leu Lys
545 550 555 560

Gly Leu Leu Gly Arg Gln Asn Arg Thr Pro Thr Ile Val Ile Val Trp
565 570 575

Ser Val Leu Leu Ala Ser Ile Phe Ser Leu Leu Trp Val Arg Ile Asp
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Pro Phe Thr Ser Asp Ser Asn Lys Leu Thr Asn Gly Gln Cys Gly Ile
595 600 605

Asn Cys
610

<210> 17
<211> 2890
<212> DNA
<213> Glycine max

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aaaaaaaaaa						2890

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 <211> 793
 <212> PRT
 <213> Glycine max

<400> 18
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Pro Lys Trp Tyr Pro Ile Gln Arg Glu Thr Tyr Leu Asp Arg Leu Ser
35 40 45

Leu Arg Tyr Glu Lys Glu Gly Lys Pro Ser Glu Leu Ser Ser Val Asp
50 55 60

Val Phe Val Ser Thr Val Asp Pro Met Lys Glu Pro Pro Leu Ile Thr
65 70 75 80

Ala Asn Thr Val Leu Ser Ile Leu Ala Val Asp Tyr Pro Val Asp Lys
85 90 95

Val Ala Cys Tyr Val Ser Asp Asp Gly Ala Ala Met Leu Thr Phe Glu
100 105 110

Ala Leu Ser Glu Thr Ser Glu Phe Ala Arg Arg Trp Val Pro Phe Cys
115 120 125

Lys Lys Tyr Asn Ile Glu Pro Arg Ala Pro Glu Trp Tyr Phe Gly Gln
130 135 140

Lys Met Asp Tyr Leu Lys Asn Lys Val His Pro Ala Phe Val Arg Glu
145 150 155 160

Arg Arg Ala Met Lys Arg Asp Tyr Glu Glu Phe Lys Val Arg Ile Asn
165 170 175

Ser Leu Val Ala Thr Ala Gln Lys Val Pro Glu Asp Gly Trp Thr Met
180 185 190

Gln Asp Gly Thr Pro Trp Pro Gly Asn Asn Val Arg Asp His Pro Gly
195 200 205

Met Ile Gln Val Phe Leu Gly Gln Asp Gly Val Arg Asp Val Glu Gly
210 215 220

Asn Glu Leu Pro Arg Leu Val Tyr Val Ser Arg Glu Lys Arg Pro Gly
225 230 235 240

Phe Asp His His Lys Lys Ala Gly Ala Met Asn Ala Leu Val Arg Ala
245 250 255

Ser Ala Ile Ile Thr Asn Ala Pro Tyr Leu Leu Asn Val Asp Cys Asp
260 265 270

His Tyr Ile Asn Asn Ser Lys Ala Leu Arg Glu Ala Met Cys Phe Met
275 280 285

Met Asp Pro Gln Leu Gly Lys Lys Val Cys Tyr Val Gln Phe Pro Gln
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Arg Phe Asp Gly Ile Asp Arg His Asp Arg Tyr Ser Asn Arg Asn Val
305 310 315 320

Val Phe Phe Asp Ile Asn Met Lys Gly Leu Asp Gly Ile Gln Gly Pro
325 330 335

Ile Tyr Val Gly Thr Gly Cys Val Phe Arg Arg Tyr Ala Leu Tyr Gly
340 345 350

Tyr Asp Ala Pro Ala Lys Lys Lys Pro Pro Ser Lys Thr Cys Asn Cys
 355 360 365
 Trp Pro Lys Trp Cys Cys Leu Cys Cys Gly Ser Arg Lys Lys Lys Asn
 370 375 380
 Ala Asn Ser Lys Lys Glu Lys Lys Arg Lys Val Lys His Ser Glu Ala
 385 390 395 400
 Ser Lys Gln Ile His Ala Leu Glu Asn Ile Glu Ala Gly Asn Glu Gly
 405 410 415
 Thr Asn Asn Glu Lys Thr Ser Asn Leu Thr Gln Thr Lys Leu Glu Lys
 420 425 430
 Arg Phe Gly Gln Ser Pro Val Phe Val Ala Ser Thr Leu Leu Asp Asp
 435 440 445
 Gly Gly Val Pro His Gly Val Ser Pro Ala Ser Leu Leu Lys Glu Ala
 450 455 460
 Ile Gln Val Ile Ser Cys Gly Tyr Glu Asp Lys Thr Glu Trp Gly Lys
 465 470 475 480
 Glu Val Gly Trp Ile Tyr Gly Ser Val Thr Glu Asp Ile Leu Thr Gly
 485 490 495
 Phe Lys Met His Cys His Gly Trp Arg Ser Val Tyr Cys Ile Pro Lys
 500 505 510
 Arg Pro Ala Phe Lys Gly Ser Ala Pro Ile Asn Leu Ser Asp Arg Leu
 515 520 525
 His Gln Val Leu Arg Trp Ala Leu Gly Ser Val Glu Ile Phe Phe Ser
 530 535 540
 Arg His Cys Pro Ile Trp Tyr Gly Tyr Gly Gly Gly Leu Lys Leu Leu
 545 550 555 560
 Glu Arg Phe Ser Tyr Ile Asn Ser Val Val Tyr Pro Trp Thr Ser Leu
 565 570 575
 Pro Leu Leu Val Tyr Cys Thr Leu Pro Ala Ile Cys Leu Leu Thr Gly
 580 585 590
 Lys Phe Ile Val Pro Glu Ile Ser Asn Tyr Ala Ser Leu Val Phe Met
 595 600 605
 Ala Leu Phe Ile Ser Ile Ala Ala Thr Gly Ile Leu Glu Met Gln Trp
 610 615 620
 Gly Gly Val Ser Ile Asp Asp Trp Trp Arg Asn Glu Gln Phe Trp Val
 625 630 635 640
 Ile Gly Gly Val Ser Ser His Leu Phe Ala Leu Phe Gln Gly Leu Leu
 645 650 655
 Lys Val Leu Ala Gly Val Asn Thr Asn Phe Thr Val Thr Ser Lys Ala
 660 665 670

Ala Asp Asp Gly Glu Phe Ser Glu Leu Tyr Ile Phe Lys Trp Thr Ser
675 680 685

Leu Leu Ile Pro Pro Met Thr Leu Leu Ile Met Asn Ile Val Gly Val
690 695 700

Val Val Gly Ile Ser Asp Ala Ile Asn Asn Gly Tyr Asp Ser Trp Gly
705 710 715 720

Pro Leu Phe Gly Arg Leu Phe Phe Ala Leu Trp Val Ile Leu His Leu
725 730 735

Tyr Pro Phe Leu Lys Gly Leu Leu Gly Lys Gln Asp Arg Met Pro Thr
740 745 750

Ile Ile Leu Val Trp Ser Ile Leu Leu Ala Ser Ile Leu Thr Leu Met
755 760 765

Trp Val Arg Ile Asn Pro Phe Val Ser Arg Asp Gly Pro Val Leu Glu
770 775 780

Ile Cys Gly Leu Asn Cys Asp Glu Ser
785 790

<210> 19
<211> 1742
<212> DNA
<213> Triticum aestivum

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<223> n = a, c g or t

<220>
<221> unsure
<222> (271)
<223> n = a, c g or t

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aagaagccag gtttcttggc atcattatgt nggggcaaga agaaggcaag caagtcaaag 300
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accaacttca ctgtcacctc aaaggctaag gatgaagaag gcgactttgc tgagctctac 1200

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atgttcaagt ggacgacgct tcttatccct ccgacgacca ttttgatcat taacatggtc 1260
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<210> 20
<211> 506
<212> PRT
<213> Triticum aestivum

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<220>
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<222> (88)
<223> xaa = any amino acid

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Tyr Ala Asn Arg Asn Thr Val Phe Phe Asp Ile Asn Leu Arg Gly Leu
      35             40             45

Asp Gly Ile Gln Gly Pro Val Tyr Val Gly Thr Gly Cys Val Phe Asn
      50             55             60

Arg Thr Ala Ile Tyr Gly Tyr Glu Pro Pro Ile Lys Ala Lys Lys Pro
      65             70             75             80

Gly Phe Leu Ala Ser Leu Cys Xaa Gly Lys Lys Lys Ala Ser Lys Ser
      85             90             95

Lys Lys Arg Ser Ser Asp Lys Lys Lys Ser Asn Lys His Val Asp Ser
      100            105            110

Ser Val Pro Val Phe Asn Leu Glu Asp Ile Glu Glu Gly Val Glu Gly
      115            120            125

Ala Gly Phe Asp Asp Glu Lys Ser Val Leu Met Ser Gln Met Ser Leu
      130            135            140

Glu Lys Arg Phe Gly Gln Ser Ala Ala Phe Val Ala Ser Thr Leu Met
      145            150            155            160

Glu Tyr Gly Gly Val Pro Gln Ser Ser Thr Pro Glu Ser Leu Leu Lys
      165            170            175

Glu Ala Ile His Val Ile Ser Cys Gly Tyr Glu Asp Lys Ser Glu Trp
      180            185            190

Gly Thr Glu Ile Gly Trp Ile Tyr Gly Ser Val Thr Glu Asp Ile Leu
      195            200            205

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Thr Gly Phe Lys Met His Ala Arg Gly Trp Arg Ser Ile Tyr Cys Met
 210 215 220
 Pro Lys Arg Pro Ala Phe Lys Gly Ser Ala Pro Ile Asn Leu Ser Asp
 225 230 235 240
 Arg Leu Asn Gln Val Leu Arg Trp Ala Leu Gly Ser Val Glu Ile Leu
 245 250 255
 Phe Ser Arg His Cys Pro Leu Trp Tyr Gly Tyr Gly Gly Arg Leu Lys
 260 265 270
 Phe Leu Glu Arg Phe Ala Tyr Ile Asn Thr Thr Ile Tyr Pro Leu Thr
 275 280 285
 Ser Leu Pro Leu Leu Val Tyr Cys Ile Leu Pro Ala Ile Cys Leu Leu
 290 295 300
 Thr Gly Lys Phe Ile Met Pro Glu Ile Ser Asn Leu Ala Ser Ile Trp
 305 310 315 320
 Phe Ile Ala Leu Phe Leu Ser Ile Phe Ala Thr Gly Ile Leu Glu Met
 325 330 335
 Arg Trp Ser Gly Val Gly Ile Asp Glu Trp Trp Arg Asn Glu Gln Phe
 340 345 350
 Trp Val Ile Gly Gly Ile Ser Ala His Leu Phe Ala Val Phe Gln Gly
 355 360 365
 Leu Leu Lys Val Leu Ala Gly Ile Asp Thr Asn Phe Thr Val Thr Ser
 370 375 380
 Lys Ala Asn Asp Glu Glu Gly Asp Phe Ala Glu Leu Tyr Met Phe Lys
 385 390 395 400
 Trp Thr Thr Leu Leu Ile Pro Pro Thr Thr Ile Leu Ile Ile Asn Met
 405 410 415
 Val Gly Val Val Ala Gly Thr Ser Tyr Ala Ile Asn Ser Gly Tyr Gln
 420 425 430
 Ser Trp Gly Pro Leu Phe Gly Lys Leu Phe Phe Ala Phe Trp Val Ile
 435 440 445
 Val His Leu Tyr Pro Phe Leu Lys Gly Leu Met Gly Arg Gln Asn Arg
 450 455 460
 Thr Pro Thr Ile Val Ile Val Trp Ala Val Leu Leu Ala Ser Ile Phe
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 Ser Leu Leu Trp Val Arg Val Asp Pro Phe Thr Thr Arg Leu Ala Gly
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 Pro Asn Ile Gln Thr Cys Gly Ile Asn Cys
 500 505

<210> 21
 <211> 1029

<212> DNA
 <213> Triticum aestivum

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 gcctggaaa 1029

<210> 22
 <211> 340
 <212> PRT
 <213> Triticum aestivum

<400> 22
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 Arg Ile His Pro Leu Pro Phe Ala Asp Pro Asn Leu Pro Val Gln Pro
 35 40 45
 Arg Ser Met Asp Pro Ser Lys Asp Leu Ala Ala Tyr Gly Tyr Gly Ser
 50 55 60
 Val Ala Trp Lys Glu Arg Met Glu Gly Trp Lys Gln Lys Gln Glu Arg
 65 70 75 80
 Leu Gln His Val Arg Ser Glu Gly Gly Gly Asp Trp Asp Gly Asp Asp
 85 90 95
 Ala Asp Leu Pro Leu Met Asp Glu Ala Arg Gln Pro Leu Ser Arg Lys
 100 105 110
 Val Pro Ile Ser Ser Ser Arg Ile Asn Pro Tyr Arg Met Ile Ile Val
 115 120 125
 Ile Arg Leu Val Val Leu Gly Phe Phe Phe His Tyr Arg Val Met His
 130 135 140
 Pro Ala Lys Asp Ala Phe Ala Leu Trp Leu Ile Ser Val Ile Cys Glu
 145 150 155 160
 Ile Trp Phe Ala Met Ser Cys Ile Leu Asp Gln Phe Pro Lys Trp Phe

165 170 175

Pro Ile Glu Arg Glu Thr Tyr Leu Asp Arg Leu Ser Leu Arg Phe Asp
180 185 190

Lys Glu Gly Gln Pro Ser Gln Leu Ala Pro Ile Asp Phe Phe Val Ser
195 200 205

Thr Val Asp Pro Thr Lys Glu Pro Pro Leu Val Thr Ala Asn Thr Val
210 215 220

Leu Ser Ile Leu Ser Val Asp Tyr Pro Val Glu Lys Val Ser Cys Tyr
225 230 235 240

Val Ser Asp Asp Gly Ala Ala Met Leu Thr Phe Glu Ala Leu Ser Glu
245 250 255

Thr Ser Glu Phe Ala Lys Lys Trp Val Pro Phe Ser Lys Lys Phe Asn
260 265 270

Ile Glu Pro Arg Ala Pro Glu Trp Tyr Phe Gln Gln Lys Ile Asp Tyr
275 280 285

Leu Lys Asp Lys Val Ala Ala Ser Phe Val Arg Glu Arg Arg Ala Met
290 295 300

Lys Arg Glu Tyr Glu Glu Phe Lys Val Arg Ile Asn Ala Leu Val Ala
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Pro Trp Pro Gly
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35 40 45

Ala Glu Thr Gly Asp Val Phe Val Ala Cys Asn Glu Cys Ala Phe Pro
50 55 60

Val Cys Arg Pro Cys Tyr Glu Tyr Glu Arg Lys Asp Gly Thr Gln Cys
65 70 75 80

Cys Pro Gln Cys Lys Thr Arg Phe Arg Arg His Arg Gly Ser Pro Arg
85 90 95

Val Glu Gly Asp Glu Asp Glu Asp Asp Val Asp Asp Ile Glu Asn Glu

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Phe	Asn	Tyr	Ala	Gln	Gly	Ala	Asn	Lys	Ala	Arg	His	Gln	Arg	His	Gly		
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Glu	Glu	Phe	Ser	Ser	Ser	Ser	Arg	His	Glu	Ser	Gln	Pro	Ile	Pro	Leu		
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Leu	Thr	His	Gly	His	Thr	Val	Ser	Gly	Glu	Ile	Arg	Thr	Pro	Asp	Thr		
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Gln	Ser	Val	Arg	Thr	Thr	Ser	Gly	Pro	Leu	Gly	Pro	Ser	Asp	Arg	Asn		
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Ala	Ile	Ser	Ser	Pro	Tyr	Ile	Asp	Pro	Arg	Gln	Pro	Val	Pro	Val	Arg		
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Ile	Val	Asp	Pro	Ser	Lys	Asp	Leu	Asn	Ser	Tyr	Gly	Leu	Gly	Asn	Val		
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Asp	Trp	Lys	Glu	Arg	Val	Glu	Gly	Trp	Lys	Leu	Lys	Gln	Glu	Lys	Asn		
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Met	Leu	Gln	Met	Thr	Gly	Lys	Tyr	His	Glu	Gly	Lys	Gly	Gly	Glu	Ile		
225					230					235					240		
Glu	Gly	Thr	Gly	Ser	Asn	Gly	Glu	Glu	Leu	Gln	Met	Ala	Asp	Asp	Thr		
				245					250					255			
Arg	Leu	Pro	Met	Ser	Arg	Val	Val	Pro	Ile	Pro	Ser	Ser	Arg	Leu	Thr		
			260					265					270				
Pro	Tyr	Arg	Val	Val	Ile	Ile	Leu	Arg	Leu	Ile	Ile	Leu	Cys	Phe	Phe		
		275					280					285					
Leu	Gln	Tyr	Arg	Thr	Thr	His	Pro	Val	Lys	Asn	Ala	Tyr	Pro	Leu	Trp		
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Asp	Gln	Phe	Pro	Lys	Trp	Tyr	Pro	Ile	Asn	Arg	Glu	Thr	Tyr	Leu	Asp		
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Arg	Leu	Ala	Ile	Arg	Tyr	Asp	Arg	Asp	Gly	Glu	Pro	Ser	Gln	Leu	Val		
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Pro	Val	Asp	Val	Phe	Val	Ser	Thr	Val	Asp	Pro	Leu	Lys	Glu	Pro	Pro		
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Leu	Val	Thr	Ala	Asn	Thr	Val	Leu	Ser	Ile	Leu	Ser	Val	Asp	Tyr	Pro		
	370					375					380						
Val	Asp	Lys	Val	Ala	Cys	Tyr	Val	Ser	Asp	Asp	Gly	Ser	Ala	Met	Leu		
385					390					395					400		
Thr	Phe	Glu	Ser	Leu	Ser	Glu	Thr	Ala	Glu	Phe	Ala	Lys	Lys	Trp	Val		
				405					410					415			
Pro	Phe	Cys	Lys	Lys	Phe	Asn	Ile	Glu	Pro	Arg	Ala	Pro	Glu	Phe	Tyr		

420	425	430
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Val Lys Glu Arg Arg Ala Met Lys Arg Glu Tyr Glu Glu Phe Lys Val 450 455 460		
Arg Ile Asn Ala Leu Val Ala Lys Ala Gln Lys Ile Pro Glu Glu Gly 465 470 475 480		
Trp Thr Met Gln Asp Gly Thr Pro Trp Pro Gly Asn Asn Thr Arg Asp 485 490 495		
His Pro Gly Met Ile Gln Val Phe Leu Gly His Ser Gly Gly Leu Asp 500 505 510		
Thr Asp Gly Asn Glu Leu Pro Arg Leu Ile Tyr Val Ser Arg Glu Lys 515 520 525		
Arg Pro Gly Phe Gln His His Lys Lys Ala Gly Ala Met Asn Ala Leu 530 535 540		
Ile Arg Val Ser Ala Val Leu Thr Asn Gly Ala Tyr Leu Leu Asn Val 545 550 555 560		
Asp Cys Asp His Tyr Phe Asn Asn Ser Lys Ala Ile Lys Glu Ala Met 565 570 575		
Cys Phe Met Met Asp Pro Ala Ile Gly Lys Lys Cys Cys Tyr Val Gln 580 585 590		
Phe Pro Gln Arg Phe Asp Gly Ile Asp Leu His Asp Arg Tyr Ala Asn 595 600 605		
Arg Asn Ile Val Phe Phe Asp Ile Asn Met Lys Gly Leu Asp Gly Ile 610 615 620		
Gln Gly Pro Val Tyr Val Gly Thr Gly Cys Cys Phe Asn Arg Gln Ala 625 630 635 640		
Leu Tyr Gly Tyr Asp Pro Val Leu Thr Glu Glu Asp Leu Glu Pro Asn 645 650 655		
Ile Ile Val Lys Ser Cys Cys Gly Ser Arg Lys Lys Gly Lys Ser Ser 660 665 670		
Lys Lys Tyr Asn Tyr Glu Lys Arg Arg Gly Ile Asn Arg Ser Asp Ser 675 680 685		
Asn Ala Pro Leu Phe Asn Met Glu Asp Ile Asp Glu Gly Phe Glu Gly 690 695 700		
Tyr Asp Asp Glu Arg Ser Ile Leu Met Ser Gln Arg Ser Val Glu Lys 705 710 715 720		
Arg Phe Gly Gln Ser Pro Val Phe Ile Ala Ala Thr Phe Met Glu Gln 725 730 735		
Gly Gly Ile Pro Pro Thr Thr Asn Pro Ala Thr Leu Leu Lys Glu Ala		

740	745	750
Ile His Val Ile Ser Cys Gly Tyr Glu Asp Lys Thr Glu Trp Gly Lys 755 760 765		
Glu Ile Gly Trp Ile Tyr Gly Ser Val Thr Glu Asp Ile Leu Thr Gly 770 775 780		
Phe Lys Met His Ala Arg Gly Trp Ile Ser Ile Tyr Cys Asn Pro Pro 785 790 795 800		
Arg Pro Ala Phe Lys Gly Ser Ala Pro Ile Asn Leu Ser Asp Arg Leu 805 810 815		
Asn Gln Val Leu Arg Trp Ala Leu Gly Ser Ile Glu Ile Leu Leu Ser 820 825 830		
Arg His Cys Pro Ile Trp Tyr Gly Tyr His Gly Arg Leu Arg Leu Leu 835 840 845		
Glu Arg Ile Ala Tyr Ile Asn Thr Ile Val Tyr Pro Ile Thr Ser Ile 850 855 860		
Pro Leu Ile Ala Tyr Cys Ile Leu Pro Ala Phe Cys Leu Ile Thr Asp 865 870 875 880		
Arg Phe Ile Ile Pro Glu Ile Ser Asn Tyr Ala Ser Ile Trp Phe Ile 885 890 895		
Leu Leu Phe Ile Ser Ile Ala Val Thr Gly Ile Leu Glu Leu Arg Trp 900 905 910		
Ser Gly Val Ser Ile Glu Asp Trp Trp Arg Asn Glu Gln Phe Trp Val 915 920 925		
Ile Gly Gly Thr Ser Ala His Leu Phe Ala Val Phe Gln Gly Leu Leu 930 935 940		
Lys Val Leu Ala Gly Ile Asp Thr Asn Phe Thr Val Thr Ser Lys Ala 945 950 955 960		
Thr Asp Glu Asp Gly Asp Phe Ala Glu Leu Tyr Ile Phe Lys Trp Thr 965 970 975		
Ala Leu Leu Ile Pro Pro Thr Thr Val Leu Leu Val Asn Leu Ile Gly 980 985 990		
Ile Val Ala Gly Val Ser Tyr Ala Val Asn Ser Gly Tyr Gln Ser Trp 995 1000 1005		
Gly Pro Leu Phe Gly Lys Leu Phe Phe Ala Leu Trp Val Ile Ala His 1010 1015 1020		
Leu Tyr Pro Phe Leu Lys Gly Leu Leu Gly Arg Gln Asn Arg Thr Pro 1025 1030 1035 1040		
Thr Ile Val Ile Val Trp Ser Val Leu Leu Ala Ser Ile Phe Ser Leu 1045 1050 1055		
Leu Trp Val Arg Ile Asn Pro Phe Val Asp Ala Asn Pro Asn Ala Asn		

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Glu Leu Ser Gly Gln Thr Cys Gln Ile Cys Gly Asp Glu Ile Glu Leu		
	35	40 45
Thr Val Ser Ser Glu Leu Phe Val Ala Cys Asn Glu Cys Ala Phe Pro		
	50	55 60
Val Cys Arg Pro Cys Tyr Glu Tyr Glu Arg Arg Glu Gly Asn Gln Ala		
	65	70 75 80
Cys Pro Gln Cys Lys Thr Arg Tyr Lys Arg Ile Lys Gly Ser Pro Arg		
	85	90 95
Val Asp Gly Asp Asp Glu Glu Glu Glu Asp Ile Asp Asp Leu Glu Tyr		
	100	105 110
Glu Phe Asp His Gly Met Asp Pro Glu His Ala Ala Glu Ala Ala Leu		
	115	120 125
Ser Ser Arg Leu Asn Thr Gly Arg Gly Gly Leu Asp Ser Ala Pro Pro		
	130	135 140
Gly Ser Gln Ile Pro Leu Leu Thr Tyr Cys Asp Glu Asp Ala Asp Met		
	145	150 155 160
Tyr Ser Asp Arg His Ala Leu Ile Val Pro Pro Ser Thr Gly Tyr Gly		
	165	170 175
Asn Arg Val Tyr Pro Ala Pro Phe Thr Asp Ser Ser Ala Pro Pro Gln		
	180	185 190
Ala Arg Ser Met Val Pro Gln Lys Asp Ile Ala Glu Tyr Gly Tyr Gly		
	195	200 205
Ser Val Ala Trp Lys Asp Arg Met Glu Val Trp Lys Arg Arg Gln Gly		
	210	215 220
Glu Lys Leu Gln Val Ile Lys His Glu Gly Gly Asn Asn Gly Arg Gly		
	225	230 235 240
Ser Asn Asp Asp Asp Glu Leu Asp Asp Pro Asp Met Pro Met Met Asp		
	245	250 255
Glu Gly Arg Gln Pro Leu Ser Arg Lys Leu Pro Ile Arg Ser Ser Arg		

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Ile	Asn	Pro	Tyr	Arg	Met	Leu	Ile	Leu	Cys	Arg	Leu	Ala	Ile	Leu	Gly	
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Leu	Phe	Phe	His	Tyr	Arg	Ile	Leu	His	Pro	Val	Asn	Asp	Ala	Tyr	Gly	
	290					295					300					
Leu	Trp	Leu	Thr	Ser	Val	Ile	Cys	Glu	Ile	Trp	Phe	Ala	Val	Ser	Trp	
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Ile	Leu	Asp	Gln	Phe	Pro	Lys	Trp	Tyr	Pro	Ile	Glu	Arg	Glu	Thr	Tyr	
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Leu	Asp	Arg	Leu	Ser	Leu	Arg	Tyr	Glu	Lys	Glu	Gly	Lys	Pro	Ser	Gly	
			340					345					350			
Leu	Ala	Pro	Val	Asp	Val	Phe	Val	Ser	Thr	Val	Asp	Pro	Leu	Lys	Glu	
		355						360					365			
Pro	Pro	Leu	Ile	Thr	Ala	Asn	Thr	Val	Leu	Ser	Ile	Leu	Ala	Val	Asp	
		370				375					380					
Tyr	Pro	Val	Asp	Lys	Val	Ala	Cys	Tyr	Val	Ser	Asp	Asp	Gly	Ala	Ala	
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Met	Leu	Thr	Phe	Glu	Ala	Leu	Ser	Asp	Thr	Ala	Glu	Phe	Ala	Arg	Lys	
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Trp	Val	Pro	Phe	Cys	Lys	Lys	Phe	Asn	Ile	Glu	Pro	Arg	Ala	Pro	Glu	
			420					425					430			
Trp	Tyr	Phe	Ser	Gln	Lys	Met	Asp	Tyr	Leu	Lys	Asn	Lys	Val	His	Pro	
		435						440					445			
Ala	Phe	Val	Arg	Glu	Arg	Arg	Ala	Met	Lys	Arg	Asp	Tyr	Glu	Glu	Phe	
		450				455					460					
Lys	Val	Lys	Ile	Asn	Ala	Leu	Val	Ala	Thr	Ala	Gln	Lys	Val	Pro	Glu	
465					470					475				480		
Glu	Gly	Trp	Thr	Met	Gln	Asp	Gly	Thr	Pro	Trp	Pro	Gly	Asn	Asn	Val	
				485					490					495		
Arg	Asp	His	Pro	Gly	Met	Ile	Gln	Val	Phe	Leu	Gly	His	Ser	Gly	Val	
			500					505					510			
Arg	Asp	Thr	Asp	Gly	Asn	Glu	Leu	Pro	Arg	Leu	Val	Tyr	Val	Ser	Arg	
		515						520					525			
Glu	Lys	Arg	Pro	Gly	Phe	Asp	His	His	Lys	Lys	Ala	Gly	Ala	Met	Asn	
		530				535					540					
Ser	Leu	Ile	Arg	Val	Ser	Ala	Val	Leu	Ser	Asn	Ala	Pro	Tyr	Leu	Leu	
545					550					555				560		
Asn	Val	Asp	Cys	Asp	His	Tyr	Ile	Asn	Asn	Ser	Lys	Ala	Ile	Arg	Glu	
				565					570					575		
Ser	Met	Cys	Phe	Met	Met	Asp	Pro	Gln	Ser	Gly	Lys	Lys	Val	Cys	Tyr	

580						585						590					
Val	Gln	Phe	Pro	Gln	Arg	Phe	Asp	Gly	Ile	Asp	Arg	His	Asp	Arg	Tyr		
		595					600					605					
Ser	Asn	Arg	Asn	Val	Val	Phe	Phe	Asp	Ile	Asn	Met	Lys	Gly	Leu	Asp		
		610				615					620						
Gly	Ile	Gln	Gly	Pro	Ile	Tyr	Val	Gly	Thr	Gly	Cys	Val	Phe	Arg	Arg		
625					630					635					640		
Gln	Ala	Leu	Tyr	Gly	Phe	Asp	Ala	Pro	Lys	Lys	Lys	Lys	Pro	Pro	Gly		
				645					650					655			
Lys	Thr	Cys	Asn	Cys	Trp	Pro	Lys	Trp	Cys	Cys	Leu	Cys	Cys	Gly	Leu		
			660					665					670				
Arg	Lys	Lys	Ser	Lys	Thr	Lys	Ala	Lys	Asp	Lys	Lys	Thr	Asn	Thr	Lys		
		675				680						685					
Glu	Thr	Ser	Lys	Gln	Ile	His	Ala	Leu	Glu	Asn	Val	Asp	Glu	Gly	Val		
		690				695					700						
Ile	Val	Pro	Val	Ser	Asn	Val	Glu	Lys	Arg	Ser	Glu	Ala	Thr	Gln	Leu		
705					710					715					720		
Lys	Leu	Glu	Lys	Lys	Phe	Gly	Gln	Ser	Pro	Val	Phe	Val	Ala	Ser	Ala		
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Val	Leu	Gln	Asn	Gly	Gly	Val	Pro	Arg	Asn	Ala	Ser	Pro	Ala	Cys	Leu		
			740					745					750				
Leu	Arg	Glu	Ala	Ile	Gln	Val	Ile	Ser	Cys	Gly	Tyr	Glu	Asp	Lys	Thr		
		755					760					765					
Glu	Trp	Gly	Lys	Glu	Ile	Gly	Trp	Ile	Tyr	Gly	Ser	Val	Thr	Glu	Asp		
		770				775					780						
Ile	Leu	Thr	Gly	Phe	Lys	Met	His	Cys	His	Gly	Trp	Arg	Ser	Val	Tyr		
785					790					795					800		
Cys	Met	Pro	Lys	Arg	Ala	Ala	Phe	Lys	Gly	Ser	Ala	Pro	Ile	Asn	Leu		
				805					810					815			
Ser	Asp	Arg	Leu	His	Gln	Val	Leu	Arg	Trp	Ala	Leu	Gly	Ser	Val	Glu		
			820					825					830				
Ile	Phe	Leu	Ser	Arg	His	Cys	Pro	Ile	Trp	Tyr	Gly	Tyr	Gly	Gly	Gly		
		835					840					845					
Leu	Lys	Trp	Leu	Glu	Arg	Phe	Ser	Tyr	Ile	Asn	Ser	Val	Val	Tyr	Pro		
		850				855					860						
Trp	Thr	Ser	Leu	Pro	Leu	Ile	Val	Tyr	Cys	Ser	Leu	Pro	Ala	Val	Cys		
865					870					875					880		
Leu	Leu	Thr	Gly	Lys	Phe	Ile	Val	Pro	Glu	Ile	Ser	Asn	Tyr	Ala	Gly		
				885					890					895			
Ile	Leu	Phe	Met	Leu	Met	Phe	Ile	Ser	Ile	Ala	Val	Thr	Gly	Ile	Leu		

900	905	910
Glu Met Gln Trp Gly Gly Val Gly Ile Asp Asp Trp Trp Arg Asn Glu 915 920 925		
Gln Phe Trp Val Ile Gly Gly Ala Ser Ser His Leu Phe Ala Leu Phe 930 935 940		
Gln Gly Leu Leu Lys Val Leu Ala Gly Val Asn Thr Asn Phe Thr Val 945 950 955 960		
Thr Ser Lys Ala Ala Asp Asp Gly Ala Phe Ser Glu Leu Tyr Ile Phe 965 970 975		
Lys Trp Thr Thr Leu Leu Ile Pro Pro Thr Thr Leu Leu Ile Ile Asn 980 985 990		
Ile Ile Gly Val Ile Val Gly Val Ser Asp Ala Ile Ser Asn Gly Tyr 995 1000 1005		
Asp Ser Trp Gly Pro Leu Phe Gly Arg Leu Phe Phe Ala Leu Trp Val 1010 1015 1020		
Ile Val His Leu Tyr Pro Phe Leu Lys Gly Met Leu Gly Lys Gln Asp 1025 1030 1035 1040		
Lys Met Pro Thr Ile Ile Val Val Trp Ser Ile Leu Leu Ala Ser Ile 1045 1050 1055		
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His Pro Ser Phe Val Lys Glu Arg Arg Ala Met Lys Arg Glu Tyr Glu 35 40 45		
Glu Phe Lys Val Arg Ile Asn Ala Leu Val Ala Lys Ala Gln Lys Lys 50 55 60		
Pro Glu Glu Gly Trp Val Met Gln Asp Gly Thr Pro Trp Pro Gly Asn 65 70 75 80		
Asn Thr Arg Asp His Pro Gly Met Ile Gln Val Tyr Leu Gly Ser Ala 85 90 95		
Gly Ala Leu Asp Val Asp Gly Lys Glu Leu Pro Arg Leu Val Tyr Val		

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Ser Arg Glu Lys Arg Pro Gly Tyr Gln His His Lys Lys Ala Gly Ala 115 120 125		
Glu Asn Ala Leu Val Arg Val Ser Ala Val Leu Thr Asn Ala Pro Phe 130 135 140		
Ile Leu Asn Leu Asp Cys Asp His Tyr Ile Asn Asn Ser Lys Ala Met 145 150 155 160		
Arg Glu Ala Met Cys Phe Leu Met Asp Pro Gln Phe Gly Lys Lys Leu 165 170 175		
Cys Tyr Val Gln Phe Pro Gln Arg Phe Asp Gly Ile Asp Arg His Asp 180 185 190		
Arg Tyr Ala Asn Arg Asn Val Val Phe Phe Asp Ile Asn Met Leu Gly 195 200 205		
Leu Asp Gly Leu Gln Gly Pro Val Tyr Val Gly Thr Gly Cys Val Phe 210 215 220		
Asn Arg Gln Ala Leu Tyr Gly Tyr Asp Pro Pro Val Ser Glu Lys Arg 225 230 235 240		
Pro Lys Met Thr Cys Asp Cys Trp Pro Ser Trp Cys Cys Cys Cys Cys 245 250 255		
Gly Gly Ser Arg Lys Lys Ser Lys Lys Lys Gly Glu Lys Lys Gly Leu 260 265 270		
Leu Gly Gly Leu Leu Tyr Gly Lys Lys Lys Lys Met Met Gly Lys Asn 275 280 285		
Tyr Val Lys Lys Gly Ser Ala Pro Val Phe Asp Leu Glu Glu Ile Glu 290 295 300		
Glu Gly Leu Glu Gly Tyr Glu Glu Leu Glu Lys Ser Thr Leu Met Ser 305 310 315 320		
Gln Lys Asn Phe Glu Lys Arg Phe Gly Gln Ser Pro Val Phe Ile Ala 325 330 335		
Ser Thr Leu Met Glu Asn Gly Gly Leu Pro Glu Gly Thr Asn Ser Thr 340 345 350		
Ser Leu Ile Lys Glu Ala Ile His Val Ile Ser Cys Gly Tyr Glu Glu 355 360 365		
Lys Thr Glu Trp Gly Lys Glu Ile Gly Trp Ile Tyr Gly Ser Val Thr 370 375 380		
Glu Asp Ile Leu Thr Gly Phe Lys Met His Cys Arg Gly Trp Lys Ser 385 390 395 400		
Val Tyr Cys Val Pro Lys Arg Pro Ala Phe Lys Gly Ser Ala Pro Ile 405 410 415		
Asn Leu Ser Asp Arg Leu His Gln Val Leu Arg Trp Ala Leu Gly Ser		

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Val Glu Ile Phe Leu Ser Arg His Cys Pro Leu Trp Tyr Gly Tyr Gly		
435	440	445
Gly Lys Leu Lys Trp Leu Glu Arg Leu Ala Tyr Ile Asn Thr Ile Val		
450	455	460
Tyr Pro Phe Thr Ser Ile Pro Leu Leu Ala Tyr Cys Thr Ile Pro Ala		
465	470	475 480
Val Cys Leu Leu Thr Gly Lys Phe Ile Ile Pro Thr Leu Ser Asn Leu		
485	490	495
Thr Ser Val Trp Phe Leu Ala Leu Phe Leu Ser Ile Ile Ala Thr Gly		
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Val Leu Glu Leu Arg Trp Ser Gly Val Ser Ile Gln Asp Trp Trp Arg		
515	520	525
Asn Glu Gln Phe Trp Val Ile Gly Gly Val Ser Ala His Leu Phe Ala		
530	535	540
Val Phe Gln Gly Leu Leu Lys Val Leu Ala Gly Val Asp Thr Asn Phe		
545	550	555 560
Thr Val Thr Ala Lys Ala Ala Asp Asp Thr Glu Phe Gly Glu Leu Tyr		
565	570	575
Leu Phe Lys Trp Thr Thr Leu Leu Ile Pro Pro Thr Thr Leu Ile Ile		
580	585	590
Leu Asn Met Val Gly Val Val Ala Gly Val Ser Asp Ala Ile Asn Asn		
595	600	605
Gly Tyr Gly Ser Trp Gly Pro Leu Phe Gly Lys Leu Phe Phe Ala Phe		
610	615	620
Trp Val Ile Leu His Leu Tyr Pro Phe Leu Lys Gly Leu Met Gly Arg		
625	630	635 640
Gln Asn Arg Thr Pro Thr Ile Val Val Leu Trp Ser Ile Leu Leu Ala		
645	650	655
Ser Ile Phe Ser Leu Val Trp Val Arg Ile Asp Pro Phe Leu Pro Lys		
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Gln	Pro	Met	Ala	Thr	Lys	Ala	Glu	Glu	Gln	Tyr	Val	Ser	Asn	Ser	Leu				
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Phe	Thr	Gly	Gly	Phe	Asn	Ser	Val	Thr	Arg	Ala	His	Leu	Met	Asp	Lys				
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Val	Ile	Asp	Ser	Asp	Val	Thr	His	Pro	Gln	Met	Ala	Gly	Ala	Lys	Gly				
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Ser	Ser	Cys	Ala	Met	Pro	Ala	Cys	Asp	Gly	Asn	Val	Met	Lys	Asp	Glu				
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145					150					155					160				
Lys	Glu	Gln	Tyr	Lys	Ile	Gly	Asp	Leu	Asp	Asp	Asp	Thr	Pro	Asp	Tyr				
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Asn	Asn	Asn	Asn	Met	Ser	Met	Met	Lys	Arg	Asn	Gln	Asn	Gly	Glu	Phe				
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Asp	His	Asn	Arg	Trp	Leu	Phe	Glu	Thr	Gln	Gly	Thr	Tyr	Gly	Tyr	Gly				
	210					215					220								
Asn	Ala	Tyr	Trp	Pro	Gln	Asp	Glu	Met	Tyr	Gly	Asp	Asp	Met	Asp	Glu				
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Gly	Met	Arg	Gly	Gly	Met	Val	Glu	Thr	Ala	Asp	Lys	Pro	Trp	Arg	Pro				
				245					250					255					
Leu	Ser	Arg	Arg	Ile	Pro	Ile	Pro	Ala	Ala	Ile	Ile	Ser	Pro	Tyr	Arg				
			260					265					270						
Leu	Leu	Ile	Val	Ile	Arg	Phe	Val	Val	Leu	Cys	Phe	Phe	Leu	Thr	Trp				
		275					280					285							
Arg	Ile	Arg	Asn	Pro	Asn	Glu	Asp	Ala	Ile	Trp	Leu	Trp	Leu	Met	Ser				
	290					295					300								
Ile	Ile	Cys	Glu	Leu	Trp	Phe	Gly	Phe	Ser	Trp	Ile	Leu	Asp	Gln	Ile				
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Pro	Lys	Leu	Cys	Pro	Ile	Asn	Arg	Ser	Thr	Asp	Leu	Glu	Val	Leu	Arg				
				325					330					335					
Asp	Lys	Phe	Asp	Met	Pro	Ser	Pro	Ser	Asn	Pro	Thr	Gly	Arg	Ser	Asp				

340	345	350
Leu Pro Gly Ile Asp Leu Phe Val Ser Thr Ala Asp Pro Glu Lys Glu 355 360 365		
Pro Pro Leu Val Thr Ala Asn Thr Ile Leu Ser Ile Leu Ala Val Asp 370 375 380		
Tyr Pro Val Glu Lys Val Ser Cys Tyr Leu Ser Asp Asp Gly Gly Ala 385 390 395 400		
Leu Leu Ser Phe Glu Ala Met Ala Glu Ala Ala Ser Phe Ala Asp Leu 405 410 415		
Trp Val Pro Phe Cys Arg Lys His Asn Ile Glu Pro Arg Asn Pro Asp 420 425 430		
Ser Tyr Phe Ser Leu Lys Ile Asp Pro Thr Lys Asn Lys Ser Arg Ile 435 440 445		
Asp Phe Val Lys Asp Arg Arg Lys Ile Lys Arg Glu Tyr Asp Glu Phe 450 455 460		
Lys Val Arg Ile Asn Gly Leu Pro Asp Ser Ile Arg Arg Arg Ser Asp 465 470 475 480		
Ala Phe Asn Ala Arg Glu Glu Met Lys Ala Leu Lys Gln Met Arg Glu 485 490 495		
Ser Gly Gly Asp Pro Thr Glu Pro Val Lys Val Pro Lys Ala Thr Trp 500 505 510		
Met Ala Asp Gly Thr His Trp Pro Gly Thr Trp Ala Ala Ser Thr Arg 515 520 525		
Glu His Ser Lys Gly Asp His Ala Gly Ile Leu Gln Val Met Leu Lys 530 535 540		
Pro Pro Ser Ser Asp Pro Leu Ile Gly Asn Ser Asp Asp Lys Val Ile 545 550 555 560		
Asp Phe Ser Asp Thr Asp Thr Arg Leu Pro Met Phe Val Tyr Val Ser 565 570 575		
Arg Glu Lys Arg Pro Gly Tyr Asp His Asn Lys Lys Ala Gly Ala Met 580 585 590		
Asn Ala Leu Val Arg Ala Ser Ala Ile Leu Ser Asn Gly Pro Phe Ile 595 600 605		
Leu Asn Leu Asp Cys Asp His Tyr Ile Tyr Asn Cys Lys Ala Val Arg 610 615 620		
Glu Gly Met Cys Phe Met Met Asp Arg Gly Gly Glu Asp Ile Cys Tyr 625 630 635 640		
Ile Gln Phe Pro Gln Arg Phe Glu Gly Ile Asp Pro Ser Asp Arg Tyr 645 650 655		
Ala Asn Asn Asn Thr Val Phe Phe Asp Gly Asn Met Arg Ala Leu Asp		

660						665						670					
Gly	Val	Gln	Gly	Pro	Val	Tyr	Val	Gly	Thr	Gly	Thr	Met	Phe	Arg	Arg		
675						680						685					
Phe	Ala	Leu	Tyr	Gly	Phe	Asp	Pro	Pro	Asn	Pro	Asp	Lys	Leu	Leu	Glu		
690						695						700					
Lys	Lys	Glu	Ser	Glu	Thr	Glu	Ala	Leu	Thr	Thr	Ser	Asp	Phe	Asp	Pro		
705						710						715					
Asp	Leu	Asp	Val	Thr	Gln	Leu	Pro	Lys	Arg	Phe	Gly	Asn	Ser	Thr	Leu		
725						730						735					
Leu	Ala	Glu	Ser	Ile	Pro	Ile	Ala	Glu	Phe	Gln	Gly	Arg	Pro	Leu	Ala		
740						745						750					
Asp	His	Pro	Ala	Val	Lys	Tyr	Gly	Arg	Pro	Pro	Gly	Ala	Leu	Arg	Val		
755						760						765					
Pro	Arg	Asp	Pro	Leu	Asp	Ala	Thr	Thr	Val	Ala	Glu	Ser	Val	Ser	Val		
770						775						780					
Ile	Ser	Cys	Trp	Tyr	Glu	Asp	Lys	Thr	Glu	Trp	Gly	Asp	Arg	Val	Gly		
785						790						795					
Trp	Ile	Tyr	Gly	Ser	Val	Thr	Glu	Asp	Val	Val	Thr	Gly	Tyr	Arg	Met		
805						810						815					
His	Asn	Arg	Gly	Trp	Arg	Ser	Val	Tyr	Cys	Ile	Thr	Lys	Arg	Asp	Ser		
820						825						830					
Phe	Arg	Gly	Ser	Ala	Pro	Ile	Asn	Leu	Thr	Asp	Arg	Leu	His	Gln	Val		
835						840						845					
Leu	Arg	Trp	Ala	Thr	Gly	Ser	Val	Glu	Ile	Phe	Phe	Ser	Arg	Asn	Asn		
850						855						860					
Ala	Ile	Leu	Ala	Ser	Lys	Arg	Leu	Lys	Phe	Leu	Gln	Arg	Leu	Ala	Tyr		
865						870						875					
Leu	Asn	Val	Gly	Ile	Tyr	Pro	Phe	Thr	Ser	Leu	Phe	Leu	Ile	Leu	Tyr		
885						890						895					
Cys	Phe	Leu	Pro	Ala	Phe	Ser	Leu	Phe	Ser	Gly	Gln	Phe	Ile	Val	Arg		
900						905						910					
Thr	Leu	Ser	Ile	Ser	Phe	Leu	Val	Tyr	Leu	Leu	Met	Ile	Thr	Ile	Cys		
915						920						925					
Leu	Ile	Gly	Leu	Ala	Val	Leu	Glu	Val	Lys	Trp	Ser	Gly	Ile	Gly	Leu		
930						935						940					
Glu	Glu	Trp	Trp	Arg	Asn	Glu	Gln	Trp	Trp	Leu	Ile	Ser	Gly	Thr	Ser		
945						950						955					
Ser	His	Leu	Tyr	Ala	Val	Val	Gln	Gly	Val	Leu	Lys	Val	Ile	Ala	Gly		
965						970						975					
Ile	Glu	Ile	Ser	Phe	Thr	Leu	Thr	Thr	Lys	Ser	Gly	Gly	Asp	Asp	Asn		

980

985

990

Glu Asp Ile Tyr Ala Asp Leu Tyr Ile Val Lys Trp Ser Ser Leu Met
 995 1000 1005

Ile Pro Pro Ile Val Ile Ala Met Val Asn Ile Ile Ala Ile Val Val
 1010 1015 1020

Ala Phe Ile Arg Thr Ile Tyr Gln Ala Val Pro Gln Trp Ser Lys Leu
 1025 1030 1035 1040

Ile Gly Gly Ala Phe Phe Ser Phe Trp Val Leu Ala His Leu Tyr Pro
 1045 1050 1055

Phe Ala Lys Gly Leu Met Gly Arg Arg Gly Lys Thr Pro Thr Ile Val
 1060 1065 1070

Phe Val Trp Ala Gly Leu Ile Ala Ile Thr Ile Ser Leu Leu Trp Thr
 1075 1080 1085

Ala Ile Asn Pro Asn Thr Gly Pro Ala Ala Ala Glu Gly Val Gly
 1090 1095 1100

Gly Gly Gly Phe Gln Phe Pro
 1105 1110

<210> 27

<211> 1026

<212> PRT

<213> Arabidopsis thaliana

<400> 27

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Asp Gly Gln Phe Cys Glu Ile Cys Gly Asp Gln Ile Gly Leu Thr Val
 35 40 45

Glu Gly Asp Leu Phe Val Ala Cys Asn Glu Cys Gly Phe Pro Ala Cys
 50 55 60

Arg Pro Cys Tyr Glu Tyr Glu Arg Arg Glu Gly Thr Gln Asn Cys Pro
 65 70 75 80

Gln Cys Lys Thr Arg Tyr Lys Arg Leu Arg Gly Ser Pro Arg Val Glu
 85 90 95

Gly Asp Glu Asp Glu Glu Asp Ile Asp Asp Ile Glu Tyr Glu Phe Asn
 100 105 110

Ile Glu His Glu Gln Asp Lys His Lys His Ser Ala Glu Ala Met Leu
 115 120 125

Tyr Gly Lys Met Ser Tyr Gly Arg Gly Pro Glu Asp Asp Glu Asn Gly
 130 135 140

Arg Phe Pro Pro Val Ile Ala Gly Gly His Ser Gly Glu Phe Pro Val

145	150	155	160
Gly Gly Gly Tyr	Gly Asn Gly Glu His	Gly Leu His Lys Arg	Val His
165	170	175	
Pro Tyr Pro Ser Ser	Glu Ala Gly Ser	Glu Gly Gly Trp	Arg Glu Arg
180	185	190	
Met Asp Asp Trp Lys	Leu Gln His Gly Asn	Leu Gly Pro Glu	Pro Asp
195	200	205	
Asp Asp Pro Glu Met	Gly Leu Ile Asp	Glu Ala Arg Gln	Pro Leu Ser
210	215	220	
Arg Lys Val Pro Ile	Ala Ser Ser Lys Ile	Asn Pro Tyr Arg	Met Val
225	230	235	240
Ile Val Ala Arg Leu	Val Ile Leu Ala Val	Phe Leu Arg Tyr	Arg Leu
245	250	255	
Leu Asn Pro Val His	Asp Ala Leu Gly	Leu Trp Leu Thr	Ser Val Ile
260	265	270	
Cys Glu Ile Trp Phe	Ala Val Ser Trp	Ile Leu Asp Gln	Phe Pro Lys
275	280	285	
Trp Phe Pro Ile Glu	Arg Glu Thr Tyr	Leu Asp Arg	Leu Ser Leu Arg
290	295	300	
Tyr Glu Arg Glu Gly	Glu Pro Asn Met	Leu Ala Pro Val	Asp Val Phe
305	310	315	320
Val Ser Thr Val Asp	Pro Leu Lys Glu	Pro Pro Leu Val	Thr Ser Asn
325	330	335	
Thr Val Leu Ser Ile	Leu Ala Met Asp	Tyr Pro Val Glu	Lys Ile Ser
340	345	350	
Cys Tyr Val Ser Asp	Asp Gly Ala Ser	Met Leu Thr Phe	Glu Ser Leu
355	360	365	
Ser Glu Thr Ala Glu	Phe Ala Arg Lys	Trp Val Pro Phe	Cys Lys Lys
370	375	380	
Phe Ser Ile Glu Pro	Arg Ala Pro Glu	Met Tyr Phe Thr	Leu Lys Val
385	390	395	400
Asp Tyr Leu Gln Asp	Lys Val His Pro	Thr Phe Val Lys	Glu Arg Arg
405	410	415	
Ala Met Lys Arg Glu	Tyr Glu Glu Phe	Lys Val Arg Ile	Asn Ala Gln
420	425	430	
Val Ala Lys Ala Ser	Lys Val Pro Leu	Glu Gly Trp Ile	Met Gln Asp
435	440	445	
Gly Thr Pro Trp Pro	Gly Asn Asn Thr	Lys Asp His Pro	Gly Met Ile
450	455	460	
Gln Val Phe Leu Gly	His Ser Gly Gly	Phe Asp Val Glu	Gly His Glu

465						470						475						480
Leu	Pro	Arg	Leu	Val	Tyr	Val	Ser	Arg	Glu	Lys	Arg	Pro	Gly	Phe	Gln			
				485					490					495				
His	His	Lys	Lys	Ala	Gly	Ala	Met	Asn	Ala	Leu	Val	Arg	Val	Ala	Gly			
			500					505					510					
Val	Leu	Thr	Asn	Ala	Pro	Phe	Met	Leu	Asn	Leu	Asp	Cys	Asp	His	Tyr			
		515					520					525						
Val	Asn	Asn	Ser	Lys	Ala	Val	Arg	Glu	Ala	Met	Cys	Phe	Leu	Met	Asp			
	530					535					540							
Pro	Gln	Ile	Gly	Lys	Lys	Val	Cys	Tyr	Val	Gln	Phe	Pro	Gln	Arg	Phe			
545					550					555					560			
Asp	Gly	Ile	Asp	Thr	Asn	Asp	Arg	Tyr	Ala	Asn	Arg	Asn	Thr	Val	Phe			
				565					570					575				
Phe	Asp	Ile	Asn	Met	Lys	Gly	Leu	Asp	Gly	Ile	Gln	Gly	Pro	Val	Tyr			
			580					585					590					
Val	Gly	Thr	Gly	Cys	Val	Phe	Lys	Arg	Gln	Ala	Leu	Tyr	Gly	Tyr	Glu			
		595					600					605						
Pro	Pro	Lys	Gly	Pro	Lys	Arg	Pro	Lys	Met	Ile	Ser	Cys	Gly	Cys	Cys			
	610					615					620							
Pro	Cys	Phe	Gly	Arg	Arg	Arg	Lys	Asn	Lys	Lys	Phe	Ser	Lys	Asn	Asp			
625					630					635					640			
Met	Asn	Gly	Asp	Val	Ala	Ala	Leu	Gly	Gly	Ala	Glu	Gly	Asp	Lys	Glu			
				645					650					655				
His	Leu	Met	Phe	Glu	Met	Asn	Phe	Glu	Lys	Thr	Phe	Gly	Gln	Ser	Ser			
			660					665					670					
Ile	Phe	Val	Thr	Ser	Thr	Leu	Met	Glu	Glu	Gly	Gly	Val	Pro	Pro	Ser			
		675					680					685						
Ser	Ser	Pro	Ala	Val	Leu	Leu	Lys	Glu	Ala	Ile	His	Val	Ile	Ser	Cys			
	690					695					700							
Gly	Tyr	Glu	Asp	Lys	Thr	Glu	Trp	Gly	Thr	Glu	Leu	Gly	Trp	Ile	Tyr			
705					710				715						720			
Gly	Ser	Ile	Thr	Glu	Asp	Ile	Leu	Thr	Gly	Phe	Lys	Met	His	Cys	Arg			
				725					730					735				
Gly	Trp	Arg	Ser	Ile	Tyr	Cys	Met	Pro	Lys	Arg	Pro	Ala	Phe	Lys	Gly			
			740					745					750					
Ser	Ala	Pro	Ile	Asn	Leu	Ser	Asp	Arg	Leu	Asn	Gln	Val	Leu	Arg	Trp			
		755					760					765						
Ala	Leu	Gly	Ser	Val	Glu	Ile	Phe	Phe	Ser	Arg	His	Ser	Pro	Leu	Trp			
	770					775					780							
Tyr	Gly	Tyr	Lys	Gly	Gly	Lys	Leu	Lys	Trp	Leu	Glu	Arg	Phe	Ala	Tyr			

785 790 795 800

Ala Asn Thr Thr Ile Tyr Pro Phe Thr Ser Ile Pro Leu Leu Ala Tyr
805 810 815

Cys Ile Leu Pro Ala Ile Cys Leu Leu Thr Asp Lys Phe Ile Met Pro
820 825 830

Pro Ile Ser Thr Phe Ala Ser Leu Phe Phe Ile Ser Leu Phe Met Ser
835 840 845

Ile Ile Val Thr Gly Ile Leu Glu Leu Arg Trp Ser Gly Val Ser Ile
850 855 860

Glu Glu Trp Trp Arg Asn Glu Gln Phe Trp Val Ile Gly Gly Ile Ser
865 870 875 880

Ala His Leu Phe Ala Val Val Gln Gly Leu Leu Lys Ile Leu Ala Gly
885 890 895

Ile Asp Thr Asn Phe Thr Val Thr Ser Lys Ala Thr Asp Asp Asp Asp
900 905 910

Phe Gly Glu Leu Tyr Ala Phe Lys Trp Thr Thr Leu Leu Ile Pro Pro
915 920 925

Thr Thr Val Leu Ile Ile Asn Ile Val Gly Val Val Ala Gly Ile Ser
930 935 940

Asp Ala Ile Asn Asn Gly Tyr Gln Ser Trp Gly Pro Leu Phe Gly Lys
945 950 955 960

Leu Phe Phe Ser Phe Trp Val Ile Val His Leu Tyr Pro Phe Leu Lys
965 970 975

Gly Leu Met Gly Arg Gln Asn Arg Thr Pro Thr Ile Val Val Ile Trp
980 985 990

Ser Val Leu Leu Ala Ser Ile Phe Ser Leu Leu Trp Val Arg Ile Asp
995 1000 1005

Pro Phe Val Leu Lys Thr Lys Gly Pro Asp Thr Ser Lys Cys Gly Ile
1010 1015 1020

Asn Cys
1025

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<400> 28

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Ala Met Leu Thr Phe Glu Ala Leu Ser Glu Thr Ser Glu Phe Ala Arg
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Lys Trp Val Pro Phe Cys Lys Lys Tyr Asn Ile Glu Pro Arg Ala Pro

Glu Trp Tyr Phe Ala Gln Lys Ile Asp Tyr Leu Lys Asp Lys Val Gln
 50 55 60
 Thr Ser Phe Val Lys Glu Arg Arg Ala Met Lys Arg Glu Tyr Glu Glu
 65 70 75 80
 Phe Lys Val Arg Val Asn Gly Leu Val Ala Lys Ala Gln Lys Val Pro
 85 90 95
 Glu Glu Gly Trp Ile Met Gln Asp Gly Thr Pro Trp Pro Gly Asn Asn
 100 105 110
 Thr Arg Asp His Pro Gly Met Ile Gln Val Phe Leu Gly Gln Ser Gly
 115 120 125
 Gly Leu Asp Ala Glu Gly Asn Glu Leu Pro Arg Leu Val Tyr Val Ser
 130 135 140
 Arg Glu Lys Arg Pro Gly Phe Gln His His Lys Lys Ala Gly Ala Met
 145 150 155 160
 Asn Ala Leu Val Arg Val Ser Ala Val Leu Thr Asn Gly Ala Phe Leu
 165 170 175
 Leu Asn Leu Asp Cys Asp His Tyr Ile Asn Asn Ser Lys Ala Leu Arg
 180 185 190
 Glu Ala Met Cys Phe Leu Met Asp Pro Asn Leu Gly Lys Gln Val Cys
 195 200 205
 Tyr Val Gln Phe Pro Gln Arg Phe Asp Gly Ile Asp Arg Asn Asp Arg
 210 215 220
 Tyr Ala Asn Arg Asn Thr Val Phe Phe Asp Ile Asn Leu Arg Gly Leu
 225 230 235 240
 Asp Gly Ile Gln Gly Pro Val Tyr Val Gly Thr Gly Cys Val Phe Asn
 245 250 255
 Arg Thr Ala Leu Tyr Gly Tyr Glu Pro Pro Leu Lys Pro Lys His Arg
 260 265 270
 Lys Thr Gly Ile Leu Ser Ser Leu Cys Gly Gly Ser Arg Lys Lys Ser
 275 280 285
 Ser Lys Ser Ser Lys Lys Gly Ser Asp Lys Lys Lys Ser Gly Lys His
 290 295 300
 Val Asp Ser Thr Val Pro Val Phe Asn Leu Glu Asp Ile Glu Glu Gly
 305 310 315 320
 Val Glu Gly Ala Gly Phe Asp Asp Glu Lys Ser Leu Leu Met Ser Gln
 325 330 335
 Met Ser Leu Glu Lys Arg Phe Gly Gln Ser Ala Val Phe Val Ala Ser
 340 345 350
 Thr Leu Met Glu Asn Gly Gly Val Pro Gln Ser Ala Thr Pro Glu Thr

355	360	365
Leu Leu Lys Glu Ala Ile His Val Ile Ser Cys Gly Tyr Glu Asp Lys 370 375 380		
Thr Asp Trp Gly Ser Glu Ile Gly Trp Ile Tyr Gly Ser Val Thr Glu 385 390 395 400		
Asp Ile Leu Thr Gly Phe Lys Met His Ala Arg Gly Trp Arg Ser Ile 405 410 415		
Tyr Cys Met Pro Lys Arg Pro Ala Phe Lys Gly Ser Ala Pro Ile Asn 420 425 430		
Leu Ser Asp Arg Leu Asn Gln Val Leu Arg Trp Ala Leu Gly Ser Val 435 440 445		
Glu Ile Leu Phe Ser Arg His Cys Pro Ile Trp Tyr Gly Tyr Ser Gly 450 455 460		
Arg Leu Lys Trp Leu Glu Arg Phe Ala Tyr Val Asn Thr Thr Ile Tyr 465 470 475 480		
Pro Val Thr Ala Ile Pro Leu Leu Met Tyr Cys Thr Leu Pro Ala Val 485 490 495		
Cys Leu Leu Thr Asn Lys Phe Ile Ile Pro Gln Ile Ser Asn Leu Ala 500 505 510		
Ser Ile Trp Phe Ile Ser Leu Phe Leu Ser Ile Phe Ala Thr Gly Ile 515 520 525		
Leu Lys Met Lys Trp Asn Gly Val Gly Ile Asp Gln Trp Trp Arg Asn 530 535 540		
Glu Gln Phe Trp Val Ile Gly Gly Val Ser Ala His Leu Phe Ala Val 545 550 555 560		
Phe Gln Gly Leu Leu Lys Val Leu Ala Gly Ile Asp Thr Asn Phe Thr 565 570 575		
Val Thr Ser Lys Ala Ser Asp Glu Asp Gly Asp Phe Ala Glu Leu Tyr 580 585 590		
Met Phe Lys Trp Thr Thr Leu Leu Ile Pro Pro Thr Thr Leu Leu Ile 595 600 605		
Ile Asn Leu Val Gly Val Val Ala Gly Ile Ser Tyr Val Ile Asn Ser 610 615 620		
Gly Tyr Gln Ser Trp Gly Pro Leu Phe Gly Lys Leu Phe Phe Ala Phe 625 630 635 640		
Trp Val Ile Ile His Leu Tyr Pro Phe Leu Lys Gly Leu Met Gly Arg 645 650 655		
Gln Asn Arg Thr Pro Thr Ile Val Val Val Trp Ser Ile Leu Leu Ala 660 665 670		
Ser Ile Phe Ser Leu Leu Trp Val Arg Ile Asp Pro Phe Thr Thr Arg		

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690	695	700
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Gly Gln Thr Cys Gln Ile Cys Arg Asp Glu Ile Glu Leu Thr Val Asp		
	35	40 45
Gly Glu Pro Phe Val Ala Cys Asn Glu Cys Ala Phe Pro Val Cys Arg		
	50	55 60
Pro Cys Tyr Glu Tyr Glu Arg Arg Glu Gly Asn Gln Ala Cys Pro Gln		
65	70	75 80
Cys Lys Thr Arg Phe Lys Arg Leu Lys Gly Ser Pro Arg Val Glu Gly		
	85	90 95
Asp Glu Glu Glu Asp Asp Ile Asp Asp Leu Asp Asn Glu Phe Glu Tyr		
	100	105 110
Gly Asn Asn Gly Ile Gly Phe Asp Gln Val Ser Glu Gly Met Ser Ile		
	115	120 125
Ser Arg Arg Asn Ser Gly Phe Pro Gln Ser Asp Leu Asp Ser Ala Pro		
	130	135 140
Pro Gly Ser Gln Ile Pro Leu Leu Thr Tyr Gly Asp Glu Asp Val Glu		
145	150	155 160
Ile Ser Ser Asp Arg His Ala Leu Ile Val Pro Pro Ser Leu Gly Gly		
	165	170 175
His Gly Asn Arg Val His Pro Val Ser Leu Ser Asp Pro Thr Val Ala		
	180	185 190
Ala His Arg Arg Leu Met Val Pro Gln Lys Asp Leu Ala Val Tyr Gly		
	195	200 205
Tyr Gly Ser Val Ala Trp Lys Asp Arg Met Glu Glu Trp Lys Arg Lys		
	210	215 220
Gln Asn Glu Lys Leu Gln Val Val Arg His Glu Gly Asp Pro Asp Phe		
225	230	235 240
Glu Asp Gly Asp Asp Ala Asp Phe Pro Met Met Asp Glu Gly Arg Gln		
	245	250 255
Pro Leu Ser Met Lys Ile Pro Ile Lys Ser Ser Lys Ile Asn Pro Tyr		

260					265					270						
Arg	Met	Leu	Ile	Val	Leu	Arg	Leu	Val	Ile	Leu	Gly	Leu	Phe	Phe	His	
275					280					285						
Tyr	Arg	Ile	Leu	His	Pro	Val	Lys	Asp	Ala	Tyr	Ala	Leu	Trp	Leu	Ile	
290					295					300						
Ser	Val	Ile	Cys	Glu	Ile	Trp	Phe	Ala	Val	Ser	Trp	Val	Leu	Asp	Gln	
305					310					315					320	
Phe	Pro	Lys	Trp	Tyr	Pro	Ile	Glu	Arg	Glu	Thr	Tyr	Leu	Asp	Arg	Leu	
325					330					335						
Ser	Leu	Arg	Tyr	Glu	Lys	Glu	Gly	Lys	Pro	Ser	Gly	Leu	Ser	Pro	Val	
340					345					350						
Asp	Val	Phe	Val	Ser	Thr	Val	Asp	Pro	Leu	Lys	Glu	Pro	Pro	Leu	Ile	
355					360					365						
Thr	Ala	Asn	Thr	Val	Leu	Ser	Ile	Leu	Ala	Val	Asp	Tyr	Pro	Val	Asp	
370					375					380						
Lys	Val	Ala	Cys	Tyr	Val	Ser	Asp	Asp	Gly	Ala	Ala	Met	Leu	Thr	Phe	
385					390					395					400	
Glu	Ala	Leu	Ser	Glu	Thr	Ala	Glu	Phe	Ala	Arg	Lys	Trp	Val	Pro	Phe	
405					410					415						
Cys	Lys	Lys	Tyr	Cys	Ile	Glu	Pro	Arg	Ala	Pro	Glu	Trp	Tyr	Phe	Cys	
420					425					430						
His	Lys	Met	Asp	Tyr	Leu	Lys	Asn	Lys	Val	His	Pro	Ala	Phe	Val	Arg	
435					440					445						
Glu	Arg	Arg	Ala	Met	Lys	Arg	Asp	Tyr	Glu	Glu	Phe	Lys	Val	Lys	Ile	
450					455					460						
Asn	Ala	Leu	Val	Ala	Thr	Ala	Gln	Lys	Val	Pro	Glu	Asp	Gly	Trp	Thr	
465					470					475					480	
Met	Gln	Asp	Gly	Thr	Pro	Trp	Pro	Gly	Asn	Ser	Val	Arg	Asp	His	Pro	
485					490					495						
Gly	Met	Ile	Gln	Val	Phe	Leu	Gly	Ser	Asp	Gly	Val	Arg	Asp	Val	Glu	
500					505					510						
Asn	Asn	Glu	Leu	Pro	Arg	Leu	Val	Tyr	Val	Ser	Arg	Glu	Lys	Arg	Pro	
515					520					525						
Gly	Phe	Asp	His	His	Lys	Lys	Ala	Gly	Ala	Met	Asn	Ser	Leu	Ile	Arg	
530					535					540						
Val	Ser	Gly	Val	Leu	Ser	Asn	Ala	Pro	Tyr	Leu	Leu	Asn	Val	Asp	Cys	
545					550					555					560	
Asp	His	Tyr	Ile	Asn	Asn	Ser	Lys	Ala	Leu	Arg	Glu	Ala	Met	Cys	Phe	
565					570					575						
Met	Met	Asp	Pro	Gln	Ser	Gly	Lys	Lys	Ile	Cys	Tyr	Val	Gln	Phe	Pro	

580

585

590

Gln Arg Phe Asp Gly Ile Asp Arg His Asp Arg Tyr Ser Asn Arg Asn
595 600 605

Val Val Phe Phe Asp Ile Asn Met Lys Gly Leu Asp Gly Leu Gln Gly
610 615 620

Pro Ile Tyr Val Gly Thr Gly Cys Val Phe Arg Arg Gln Ala Leu Tyr
625 630 635 640

Gly Phe Asp Ala Pro Lys Lys Lys Lys Gly Pro Arg Lys Thr Cys Asn
645 650 655

Cys Trp Pro Lys Trp Cys Leu Leu Cys Phe Gly Ser Arg Lys Asn Arg
660 665 670

Lys Ala Lys Thr Val Ala Ala Asp Lys Lys Lys Lys Asn Arg Glu Ala
675 680 685

Ser Lys Gln Ile His Ala Leu Glu Asn Ile Glu Glu Gly Arg Gly His
690 695 700

Lys Val Leu Asn Val Glu Gln Ser Thr Glu Ala Met Gln Met Lys Leu
705 710 715 720

Gln Lys Lys Tyr Gly Gln Ser Pro Val Phe Val Ala Ser Ala Arg Leu
725 730 735

Glu Asn Gly Gly Met Ala Arg Asn Ala Ser Pro Ala Cys Leu Leu Lys
740 745 750

Glu Ala Ile Gln Val Ile Ser Arg Gly Tyr Glu Asp Lys Thr Glu Trp
755 760 765

Gly Lys Glu Ile Gly Trp Ile Tyr Gly Ser Val Thr Glu Asp Ile Leu
770 775 780

Thr Gly Ser Lys Met His Ser His Gly Trp Arg His Val Tyr Cys Thr
785 790 795 800

Pro Lys Leu Ala Ala Phe Lys Gly Ser Ala Pro Ile Asn Leu Ser Asp
805 810 815

Arg Leu His Gln Val Leu Arg Trp Ala Leu Gly Ser Val Glu Ile Phe
820 825 830

Leu Ser Arg His Cys Pro Ile Trp Tyr Gly Tyr Gly Gly Leu Lys
835 840 845

Trp Leu Glu Arg Leu Ser Tyr Ile Asn Ser Val Val Tyr Pro Trp Thr
850 855 860

Ser Leu Pro Leu Ile Val Tyr Cys Ser Leu Pro Ala Ile Cys Leu Leu
865 870 875 880

Thr Gly Lys Phe Ile Val Pro Glu Ile Ser Asn Tyr Ala Ser Ile Leu
885 890 895

Phe Met Ala Leu Phe Ser Ser Ile Ala Ile Thr Gly Ile Leu Glu Met

900 905 910
 Gln Trp Gly Lys Val Gly Ile Asp Asp Trp Trp Arg Asn Glu Gln Phe
 915 920 925
 Trp Val Ile Gly Gly Val Ser Ala His Leu Phe Ala Leu Phe Gln Gly
 930 935 940
 Leu Leu Lys Val Leu Ala Gly Val Asp Thr Asn Phe Thr Val Thr Ser
 945 950 955 960
 Lys Ala Ala Asp Asp Gly Glu Phe Ser Asp Leu Tyr Leu Phe Lys Trp
 965 970 975
 Thr Ser Leu Leu Ile Pro Pro Met Thr Leu Leu Ile Ile Asn Val Ile
 980 985 990
 Gly Val Ile Val Gly Val Ser Asp Ala Ile Ser Asn Gly Tyr Asp Ser
 995 1000 1005
 Trp Gly Pro Leu Phe Gly Arg Leu Phe Phe Ala Leu Trp Val Ile Ile
 1010 1015 1020
 His Leu Tyr Pro Phe Leu Lys Gly Leu Leu Gly Lys Gln Asp Arg Met
 1025 1030 1035 1040
 Pro Thr Ile Ile Val Val Trp Ser Ile Leu Leu Ala Ser Ile Leu Thr
 1045 1050 1055
 Leu Leu Trp Val Arg Val Asn Pro Phe Val Ala Lys Gly Gly Pro Ile
 1060 1065 1070
 Leu Glu Ile Cys Gly Leu Asp Cys Leu
 1075 1080